COMPUTER NETWORKS LAB

SUBMITTED TO:

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SUBMITTED BY;

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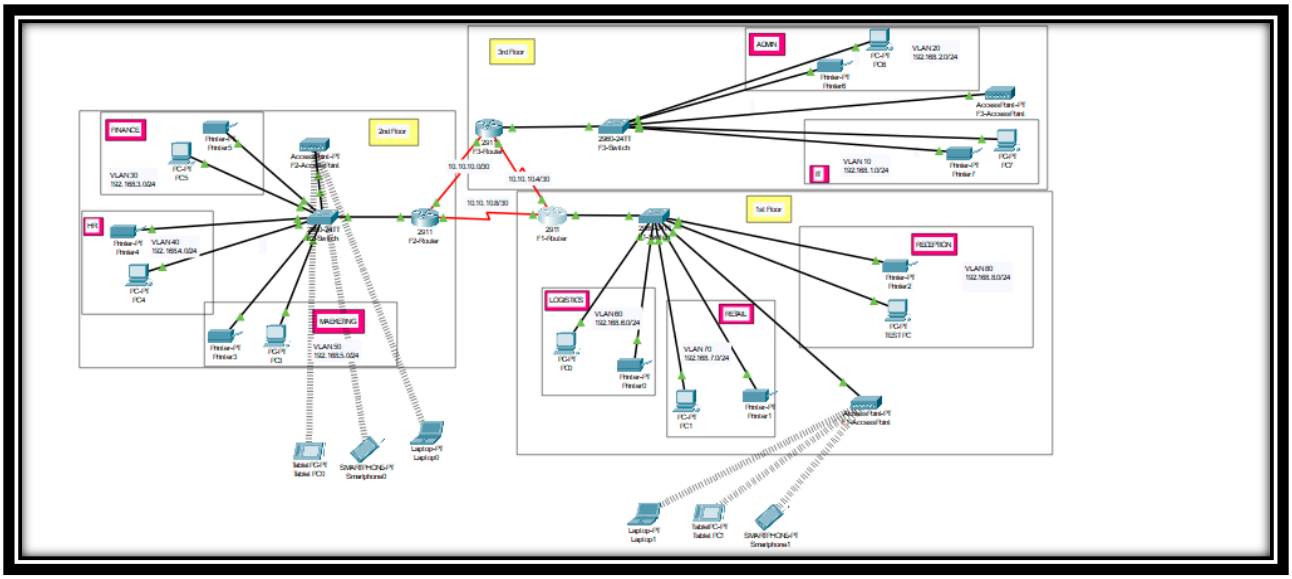
(2021-BSE-032)

“AIRPORT MANAGEMENT SYSTEM”

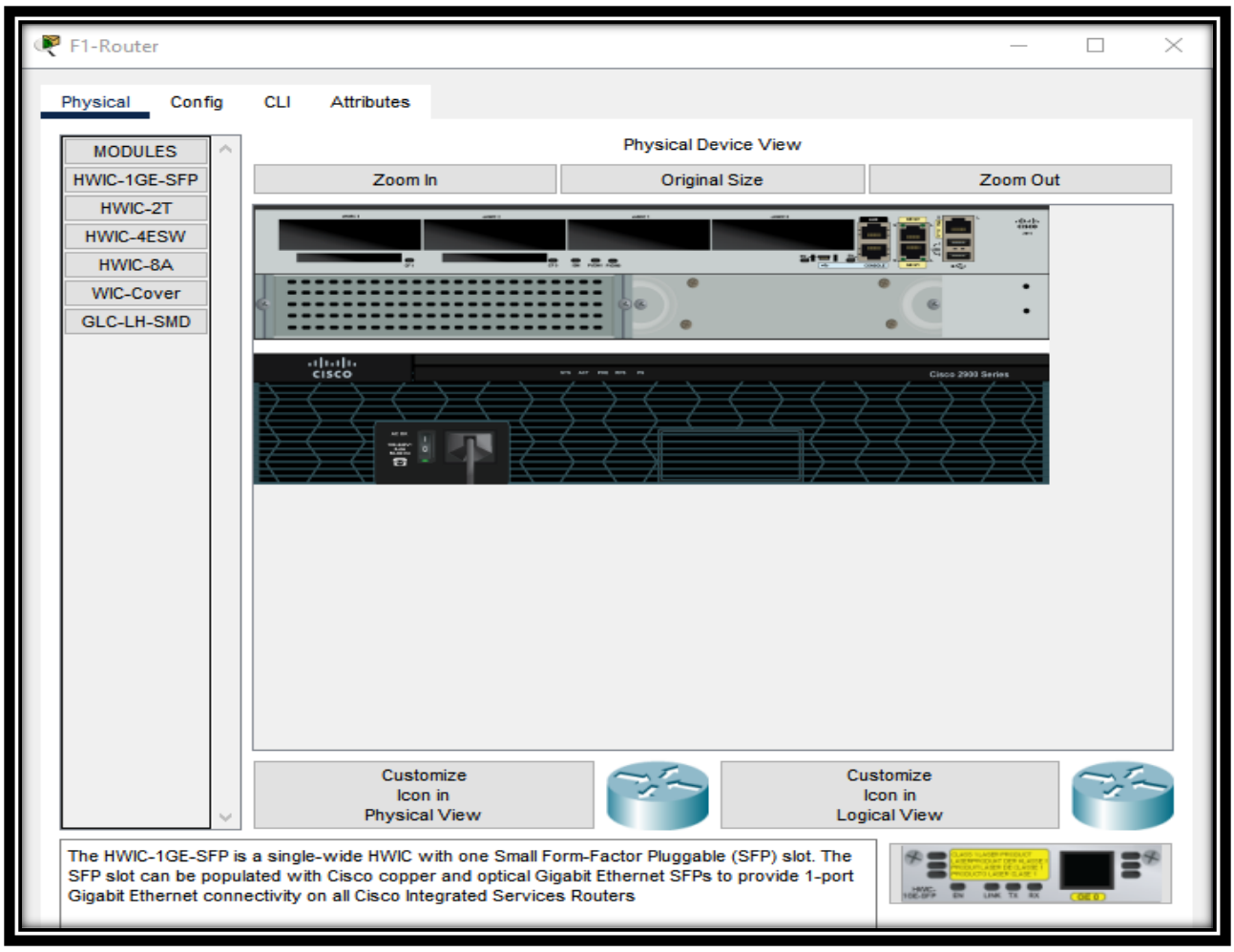
Designing an efficient and secure Airport Management System (AMS) on Cisco Packet Tracer involves the integration of various networking technologies to ensure seamless operations. The implementation encompasses the utilization of Open Shortest Path First (OSPF) protocol for dynamic routing, facilitating optimal data traffic within the airport network. Secure Shell (SSH) is employed for remote login, providing a robust and encrypted means of accessing network devices, enhancing overall system security. Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) services are integrated to automate IP address assignment and facilitate domain name resolution, streamlining network management. Virtual LANs (VLANs) are utilized to segment network traffic, ensuring efficient communication and enhancing security. Furthermore, port security is implemented to control access and mitigate unauthorized network access, contributing to overall network integrity. Additionally, the incorporation of wireless connections to the internet establishes seamless connectivity for both passengers and staff, enhancing the overall functionality of the Airport Management System. This comprehensive approach ensures a robust, secure, and well-managed airport network infrastructure within the simulated environment of Cisco Packet Tracer.

NETWORK VIEW:



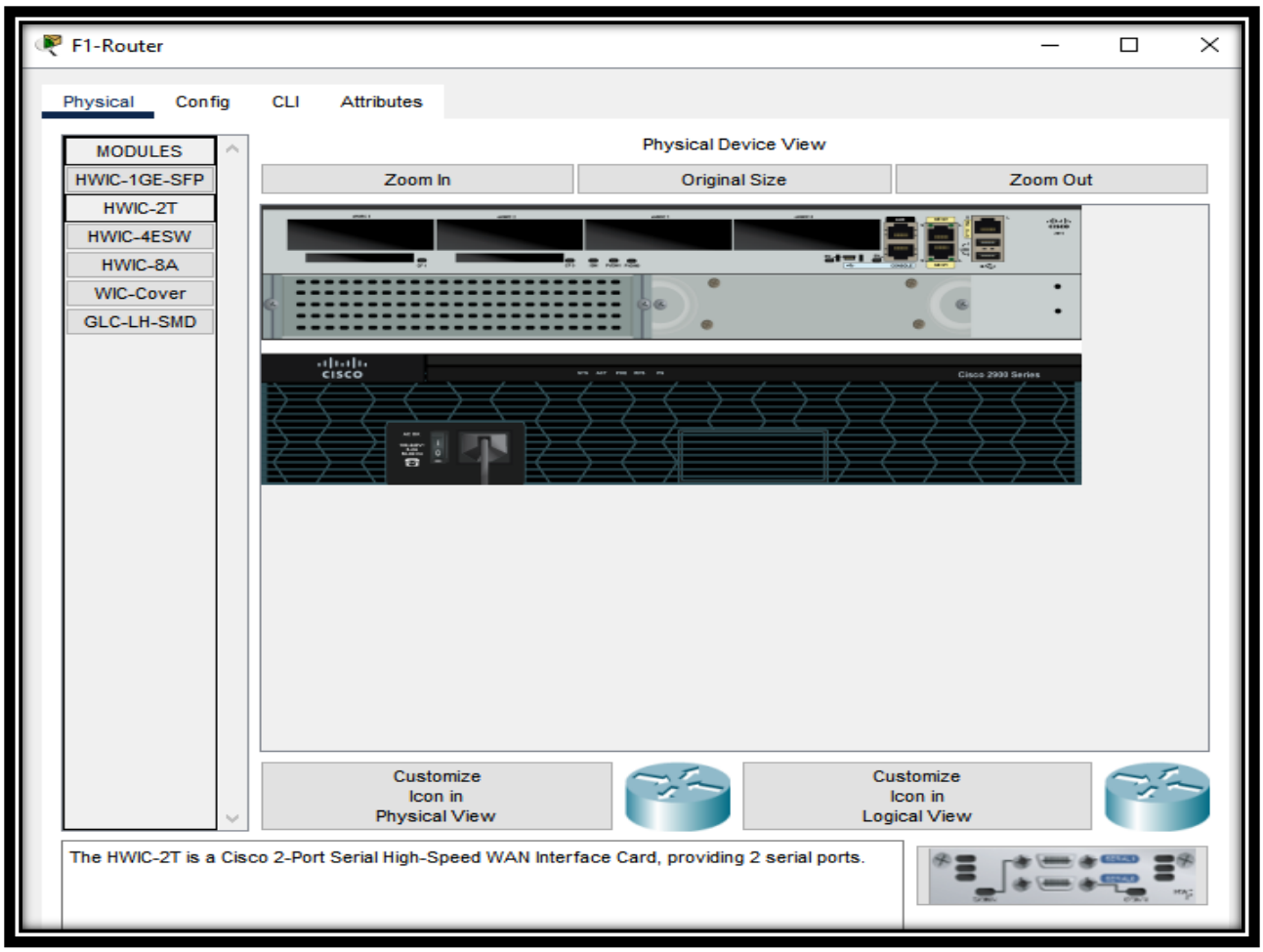
Router F1:

- Click on router

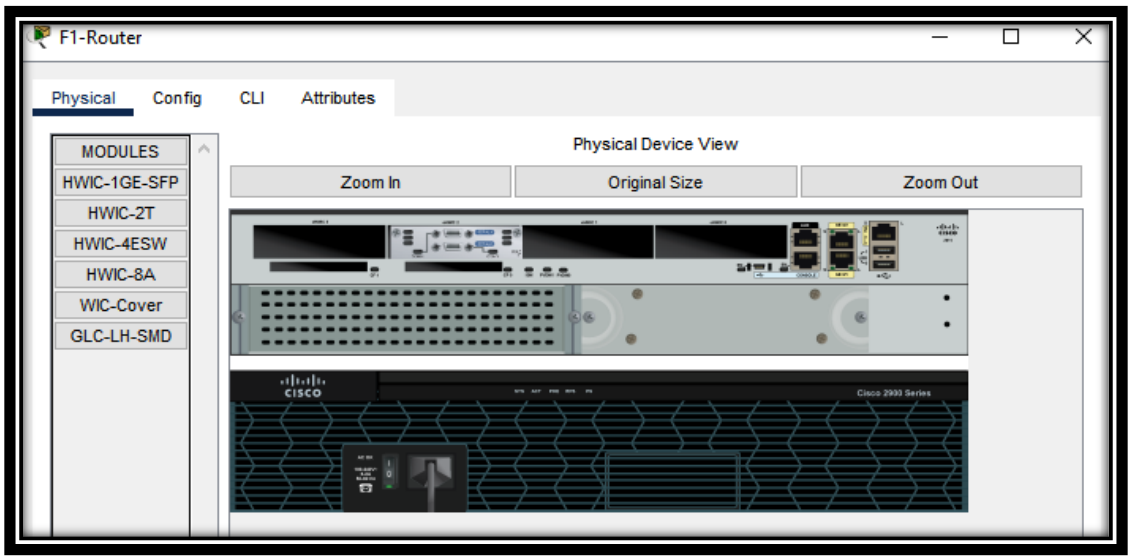


- Turn off the router by clicking on 0

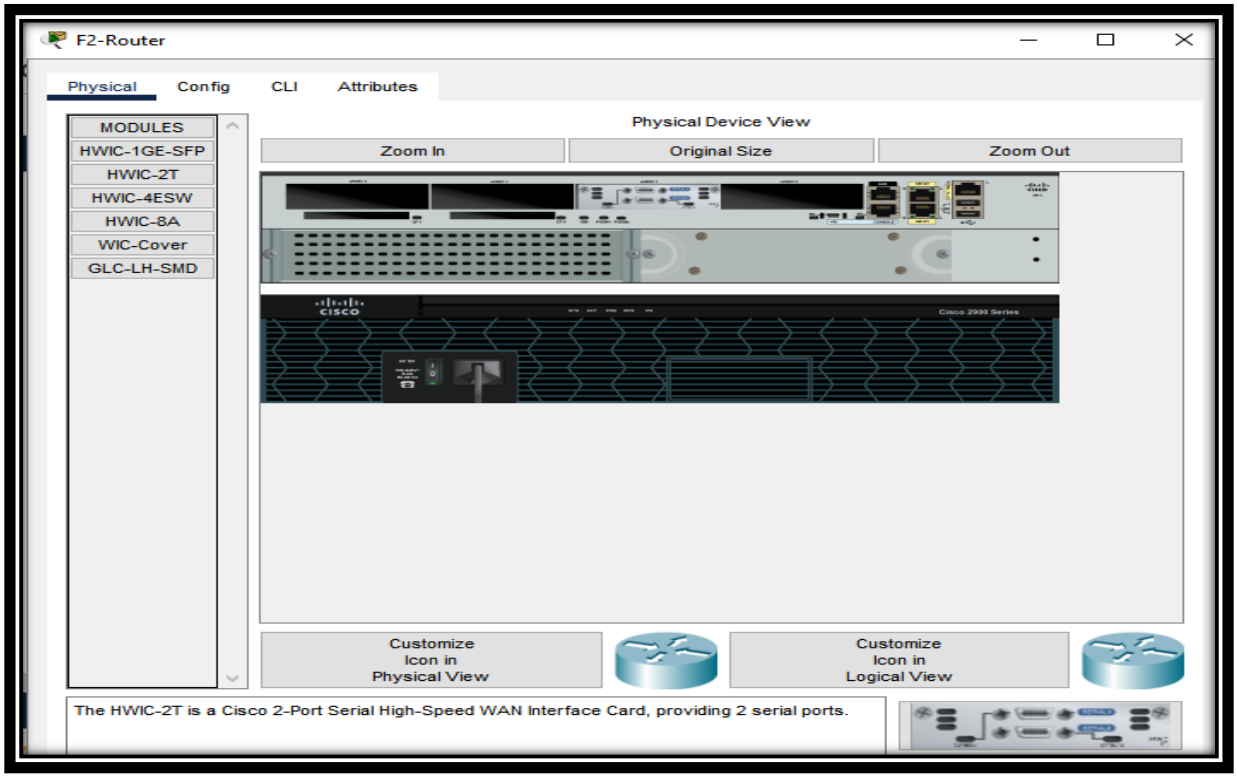
- By clicking on 0 green light will turn into white
- Now add Serial interfaces
- Come under the modules and choose HWIC-2T



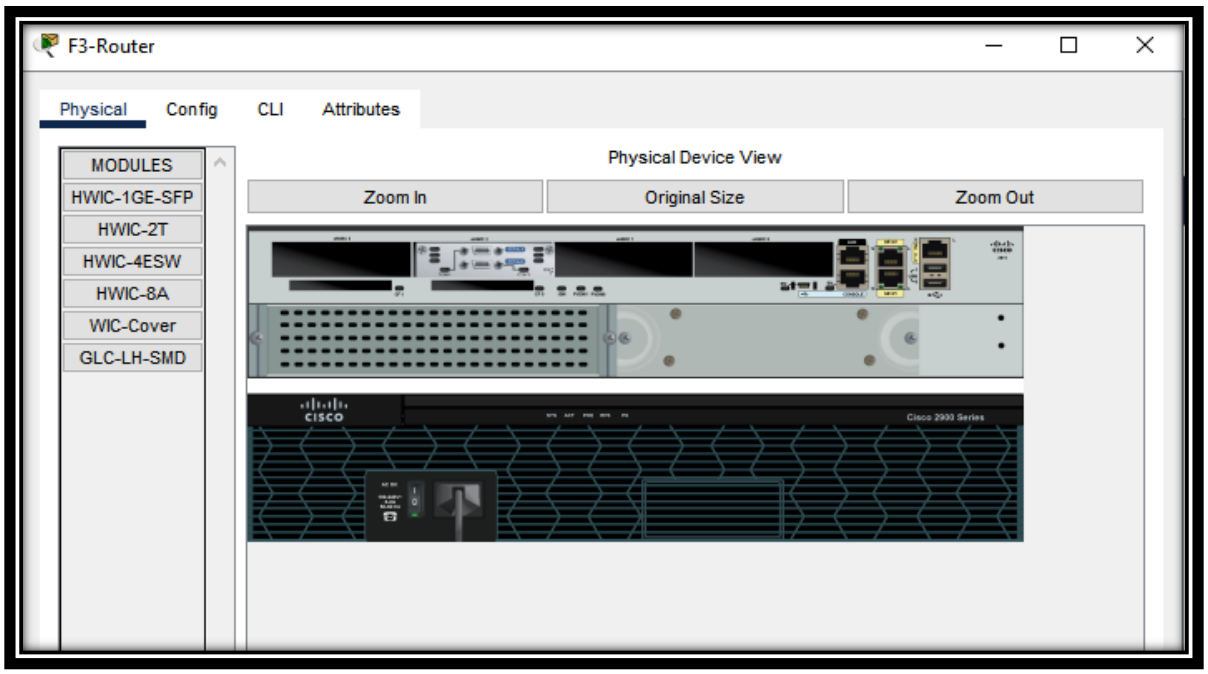
- Drag it to every node and click the router up



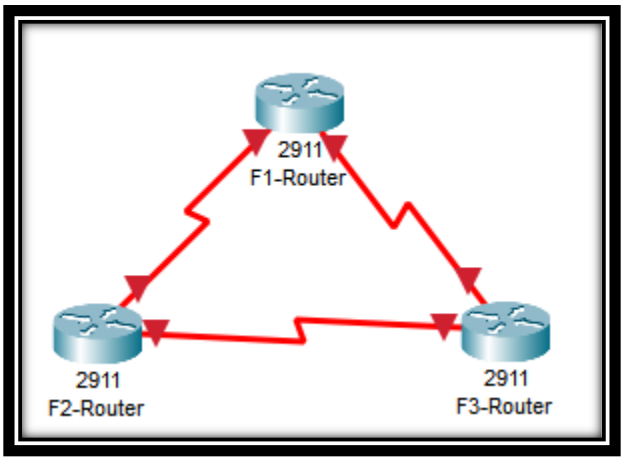
F2-Router:



F3-Router:

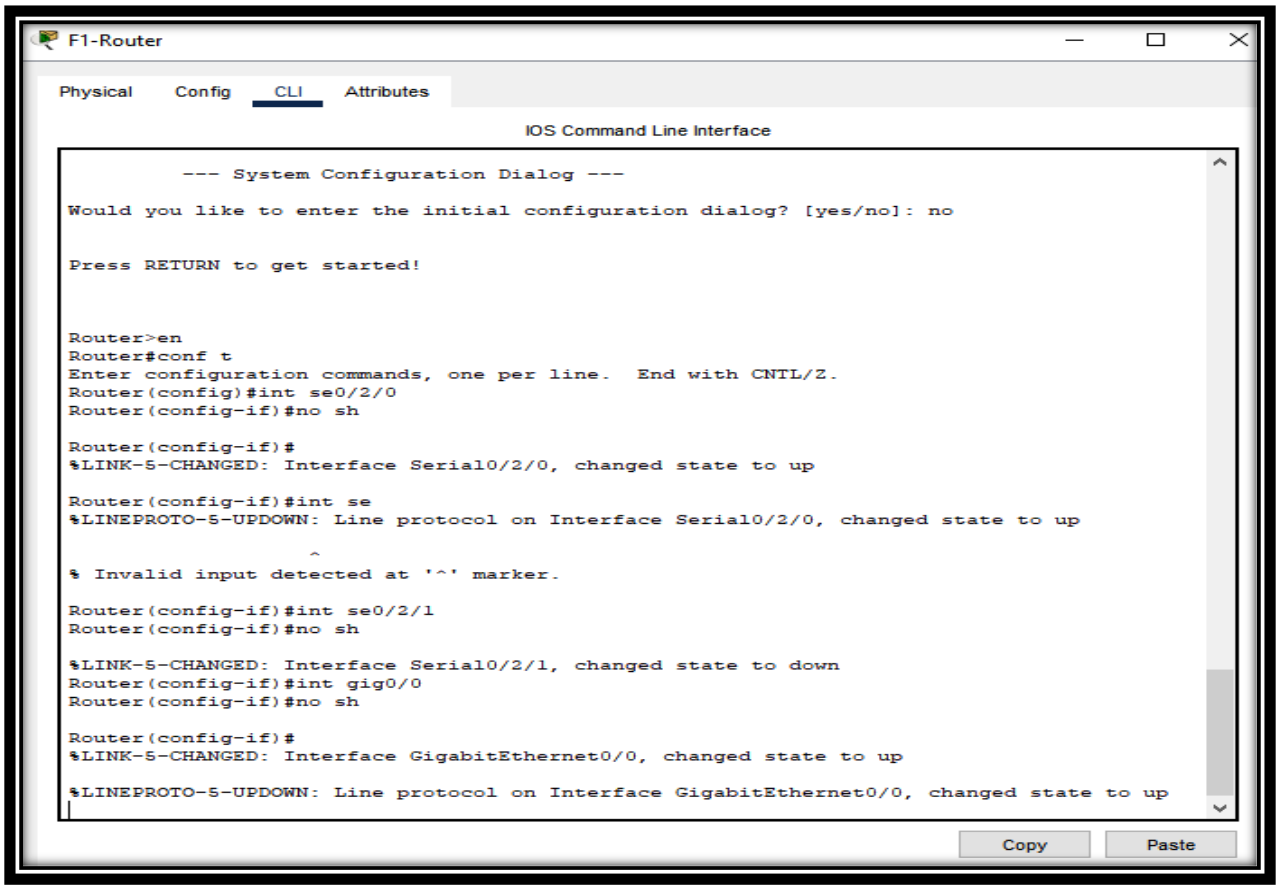


- Connect Routers by Serial DCE wires:

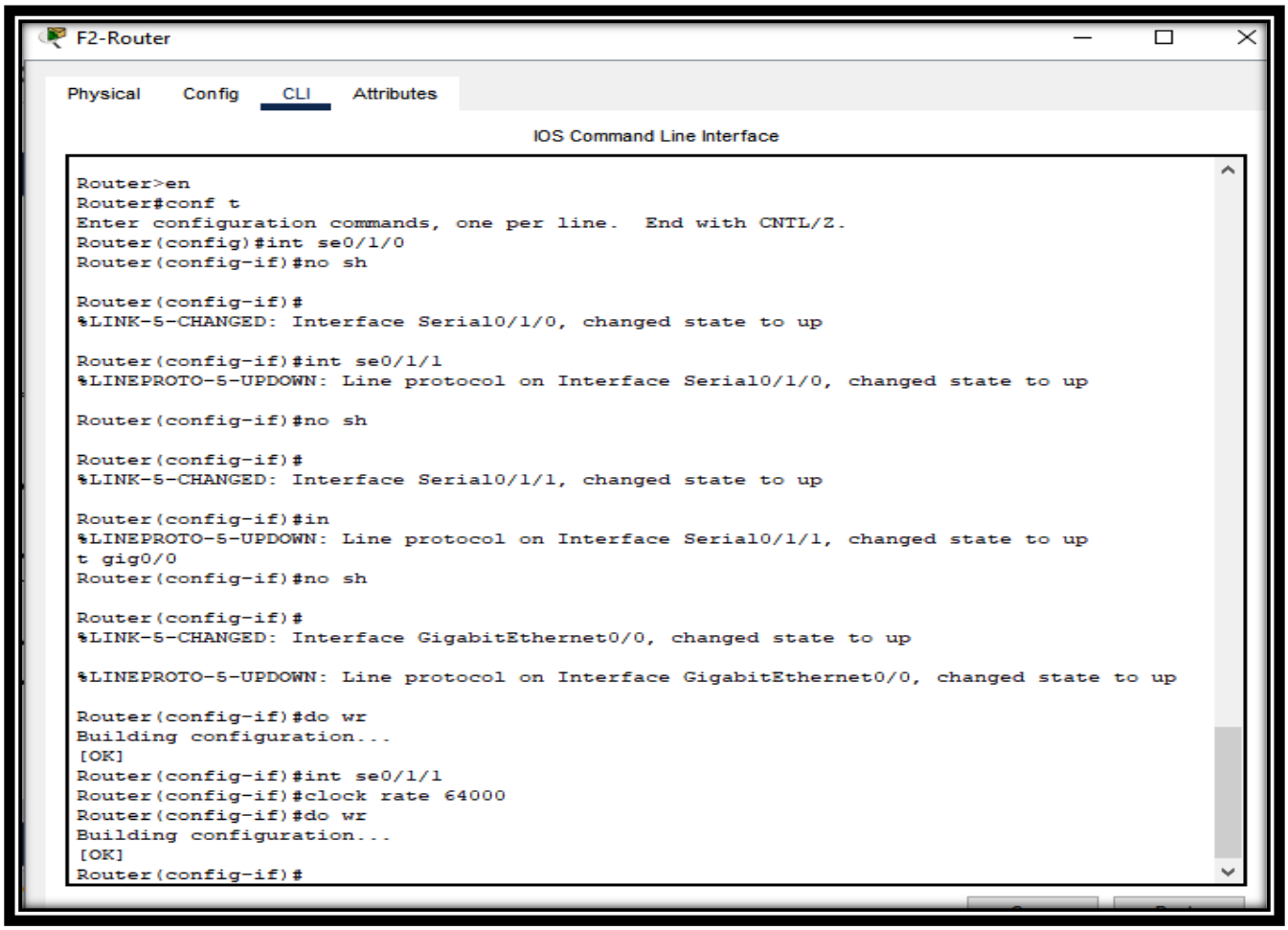


OSPF ROUTING PROTOCOL:

ROUTER F1:

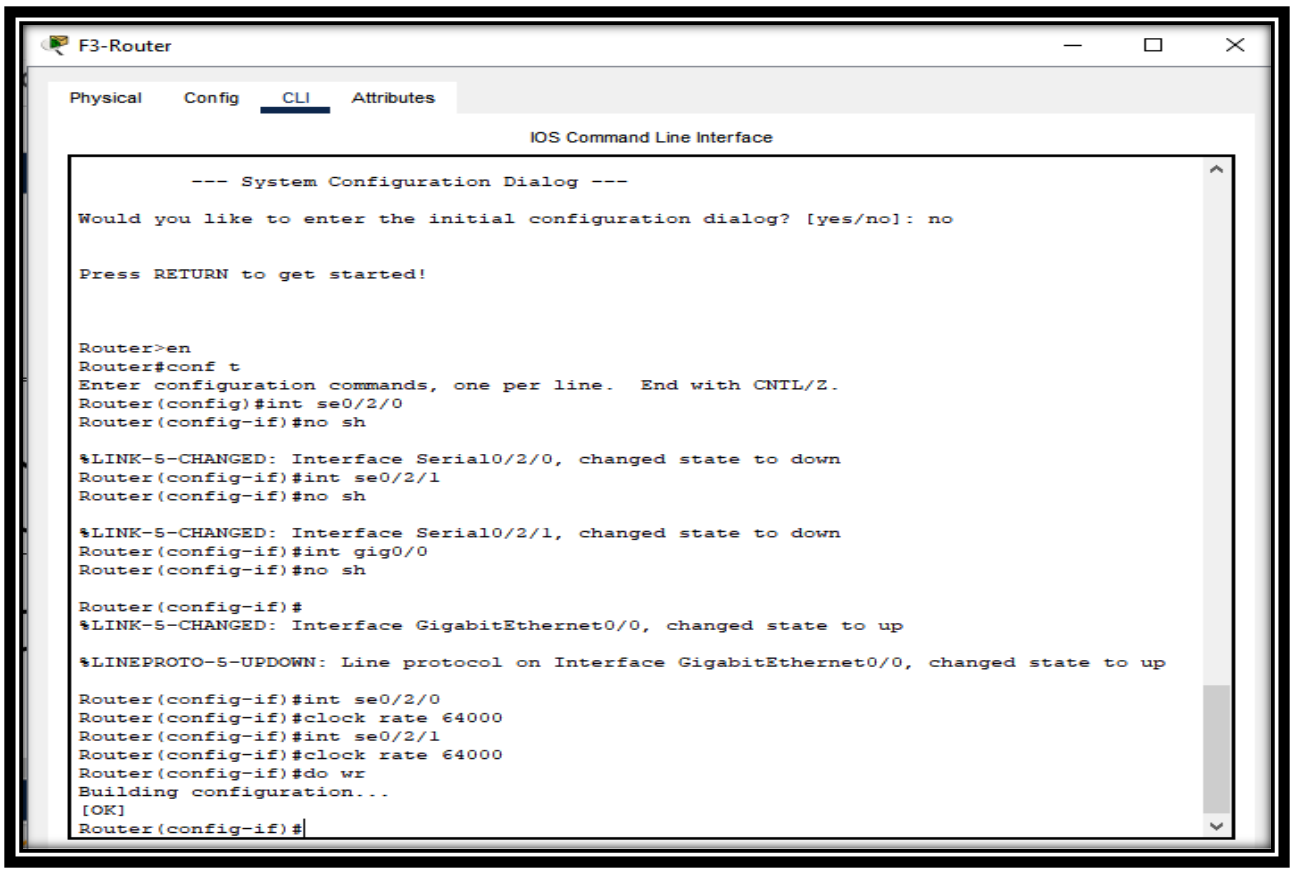


ROUTER F2:



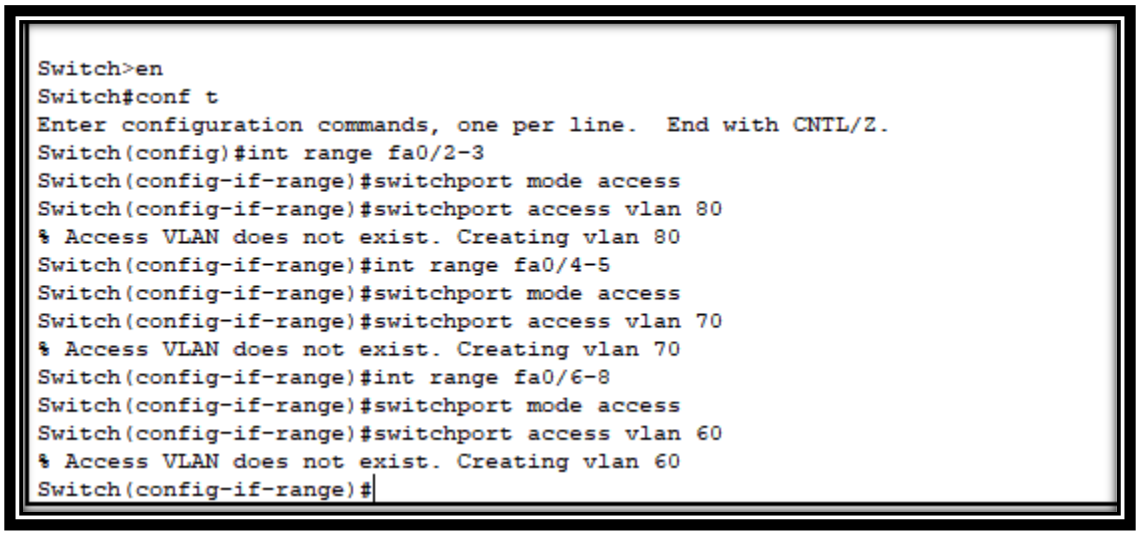
ROUTER F3:

- Enabling clock rate:



Enabling VLANS:

F1-Switch:



```
Switch(config-if-range)#int range fa0/1
Switch(config-if-range)#switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#
```

F2-Switch:

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 50
% Access VLAN does not exist. Creating vlan 50
Switch(config-if-range)#int range fa0/4-5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 40
% Access VLAN does not exist. Creating vlan 40
Switch(config-if-range)#int range fa0/6-8
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 30
% Access VLAN does not exist. Creating vlan 30
Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#
```

```
Building configuration...
[OK]
Switch(config-if-range)#int range fa0/1
Switch(config-if-range)#switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#
```

F3-Switch:

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
% Access VLAN does not exist. Creating vlan 20
Switch(config-if-range)#int range fa0/4-6
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
Switch(config-if-range)#int range fa0/1
Switch(config-if-range)#switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Switch(config-if-range)#do wr
Building configuration...
[OK]
Switch(config-if-range)#
```

Routing Interface Protocol:

F1-ROUTER:

```
Router>EN
Router#CONF T
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int se0/2/0
Router(config-if)#ip address 10.10.10.5 255.255.255.252
Router(config-if)#
Router(config-if)#int se0/2/1
Router(config-if)#ip address 10.10.10.9 255.255.255.252
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#
```

INTER VLAN DEFAULT GATEWAY CONFIGURATION:

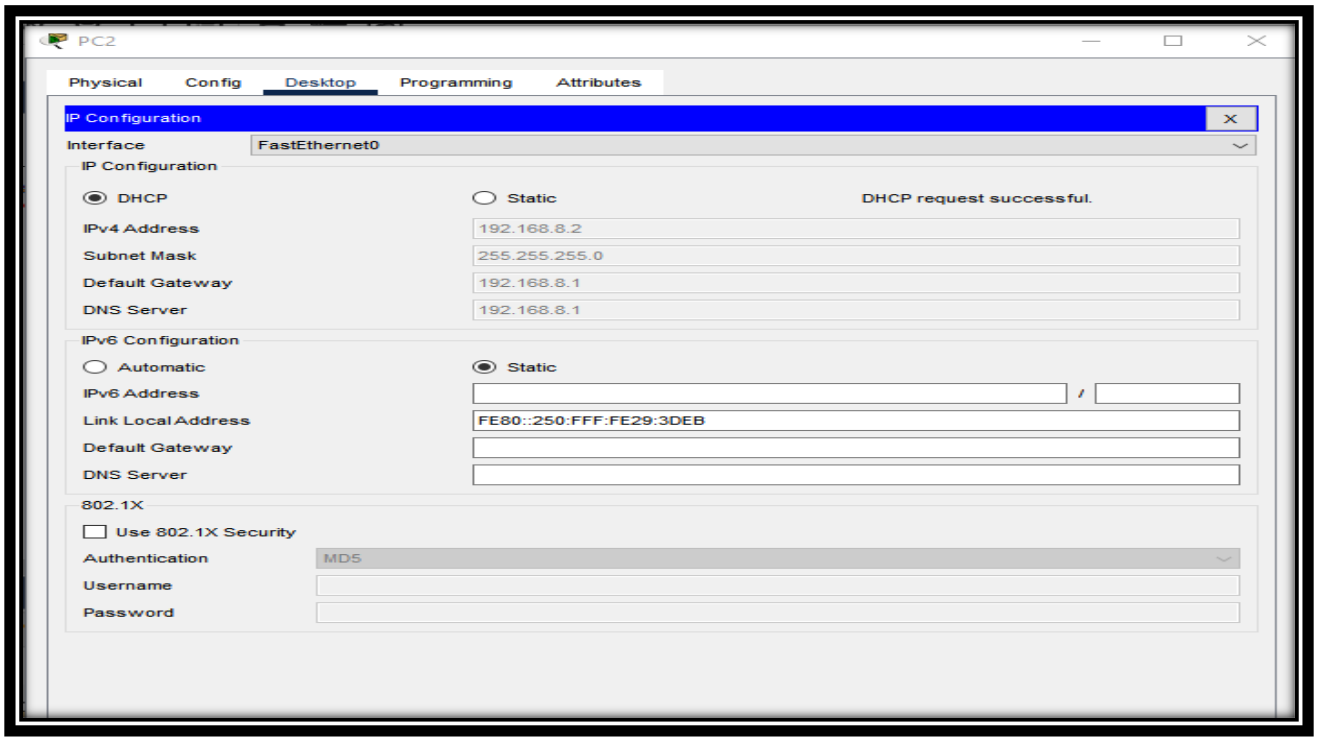
```
Router(config)#int gig0/0.80
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.80, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.80, changed state to up

Router(config-subif)#enc
% Incomplete command.
Router(config-subif)#encapsulation dot1Q 80
Router(config-subif)#ip address 192.168.8.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
Router(config)#int gig0/0.70
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.70, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.70, changed state to up

Router(config-subif)#encapsulation dot1Q 70
Router(config-subif)#ip address 192.168.7.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
Router(config)#int gig0/0.60
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.60, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.60, changed state to up

Router(config-subif)#encapsulation dot1Q 60
Router(config-subif)#ip address 192.168.6.1 255.255.255.0
Router(config-subif)#do wr
Building configuration...
[OK]
Router(config-subif)#exit
```

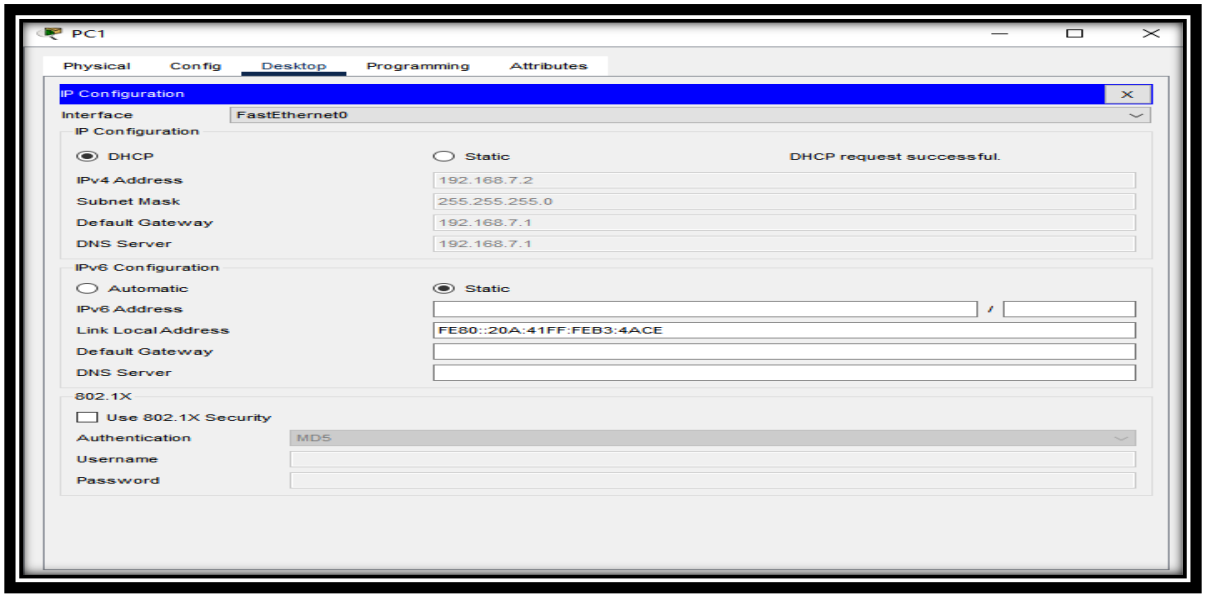
DHCP and DNS CONFIGURATION:

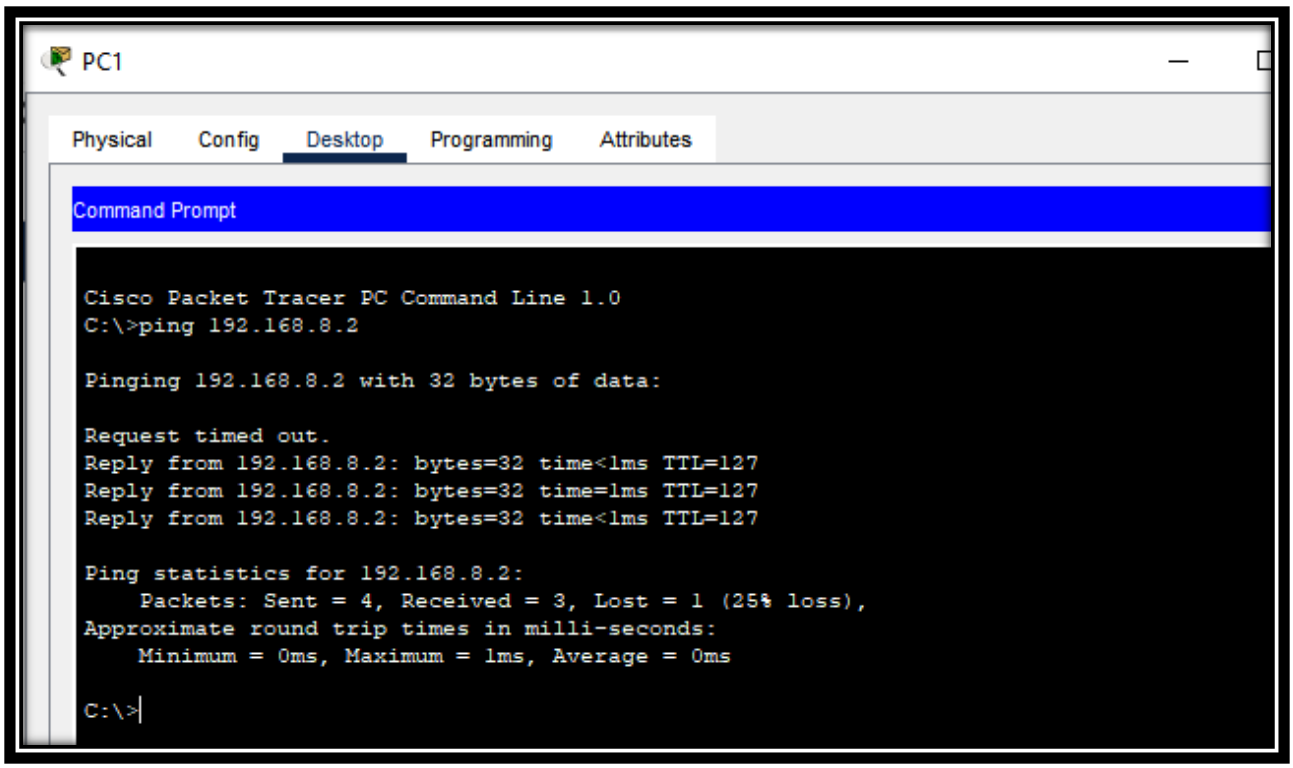
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#serv
% Incomplete command.
Router(config)#service dhcp
Router(config)#ip dhcp pool RECEPTION
Router(dhcp-config)#network 192.168.8.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.8.1
Router(dhcp-config)#dns-server 192.168.8.1
Router(dhcp-config)#exit
Router(config)#
```

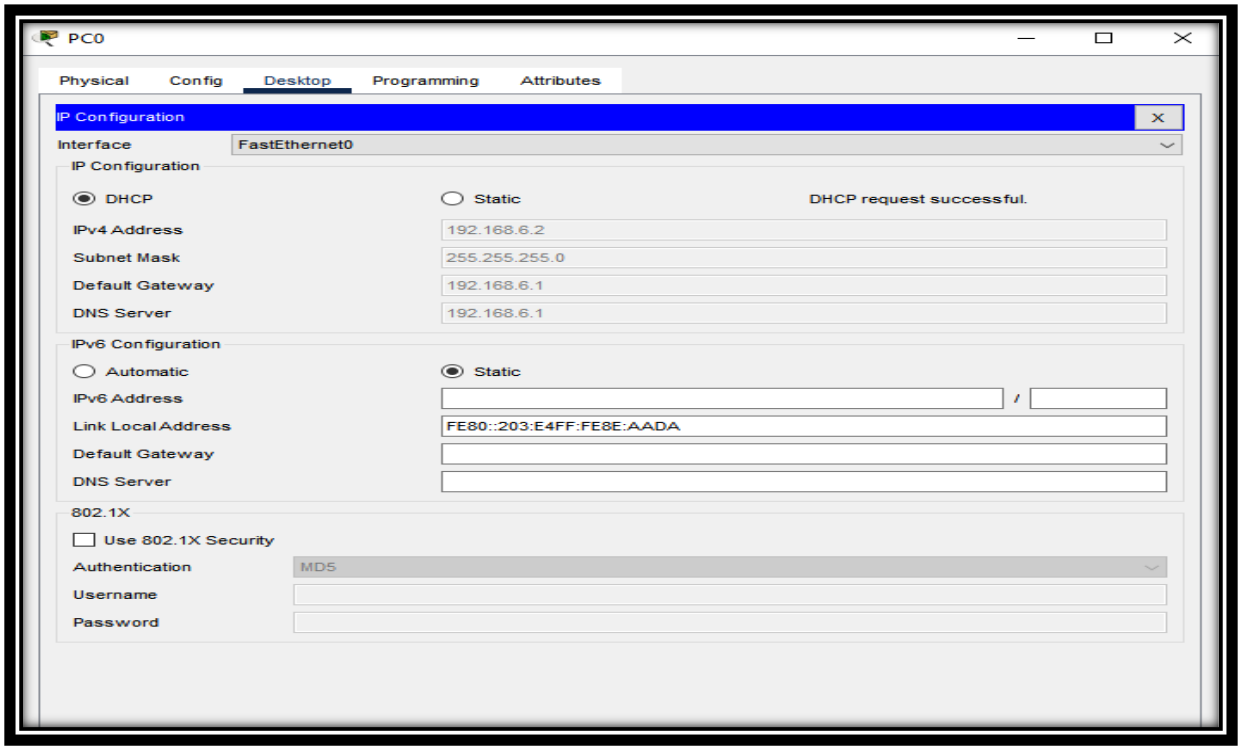
```
Router(config)#ip dhcp pool RETAIL
Router(dhcp-config)#network 192.168.7.0 255.255.255.0
Router(dhcp-config)#dns-server 192.168.7.1
Router(dhcp-config)#default-router 192.168.7.1
Router(dhcp-config)#exit
Router(config)#
```

```
Router(config)#ip dhcp pool LOGISTICS
Router(dhcp-config)#network 192.168.6.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.6.1
Router(dhcp-config)#dns-server 192.168.6.1
Router(dhcp-config)#exit
Router(config)#
Router(config)#do wr
Building configuration...
[OK]
```






PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.8.2
Pinging 192.168.8.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.8.2: bytes=32 time<1ms TTL=127
Reply from 192.168.8.2: bytes=32 time=1ms TTL=127
Reply from 192.168.8.2: bytes=32 time<1ms TTL=127
Ping statistics for 192.168.8.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>


PC0
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
DHCP request successful.
IPv4 Address
192.168.6.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.6.1
DNS Server
192.168.6.1
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::203:E4FF:FE8E:AADA
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password

F2-ROUTER:

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int se0/1/0
Router(config-if)#ip address 10.10.10.1 255.255.255.252
Router(config-if)#int se0/1/1
Router(config-if)#ip address 10.10.10.10 255.255.255.252
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#
```

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0.30
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.30, changed state to
up

Router(config-subif)#encapsulation dot 1Q 10
                                        ^
% Invalid input detected at '^' marker.

Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#encapsulation dot1Q 30
Router(config-subif)#ip address 192.168.3.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int gig0/0.40
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.40, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.40, changed state to
up

Router(config-subif)#encapsulation dot1Q 40
Router(config-subif)#ip address 192.168.4.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int gig0/0.50
```

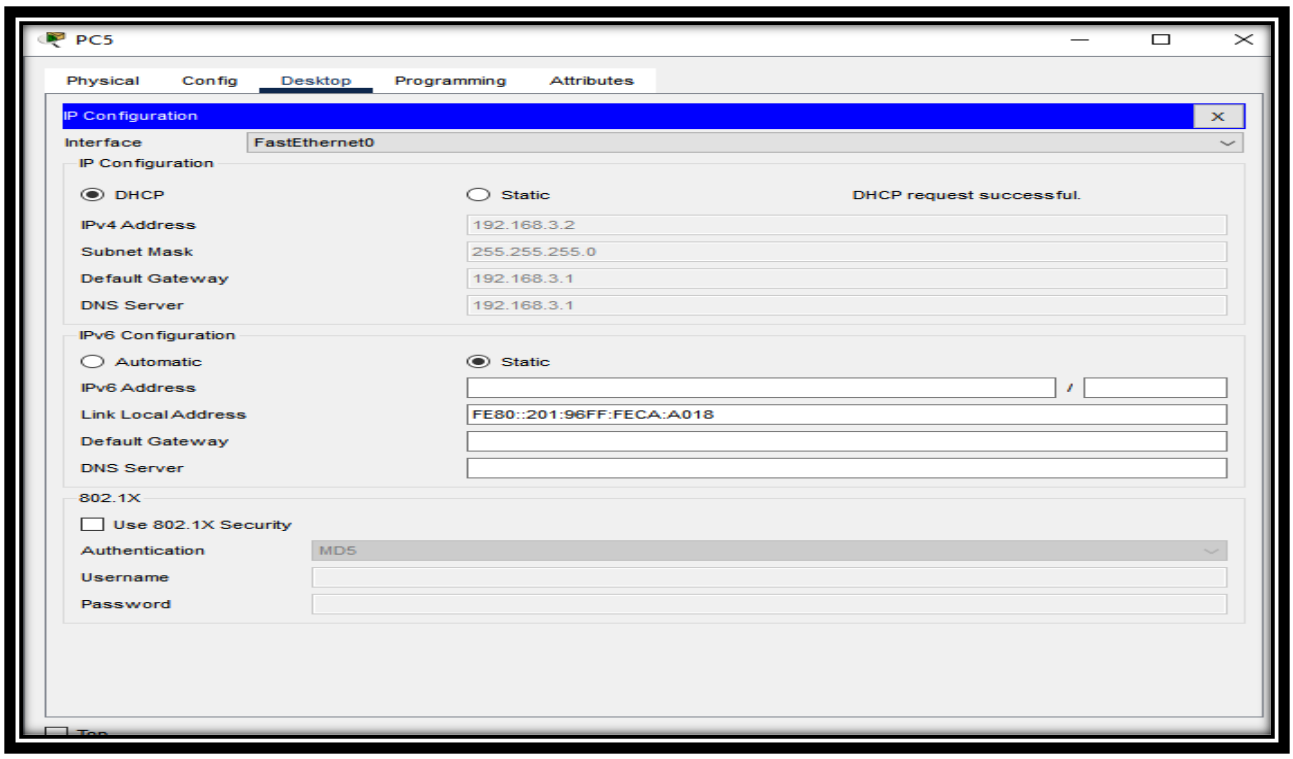
```
Router(config)#int gig0/0.50
Router(config-subif)#encapsulation dot1Q 50
Router(config-subif)#ip address 192.168.5.1 255.255.255.0
Router(config-subif)#exit
Router(config)#
Router(config)#
Router(config)#do wr
Building configuration...
[OK]
```

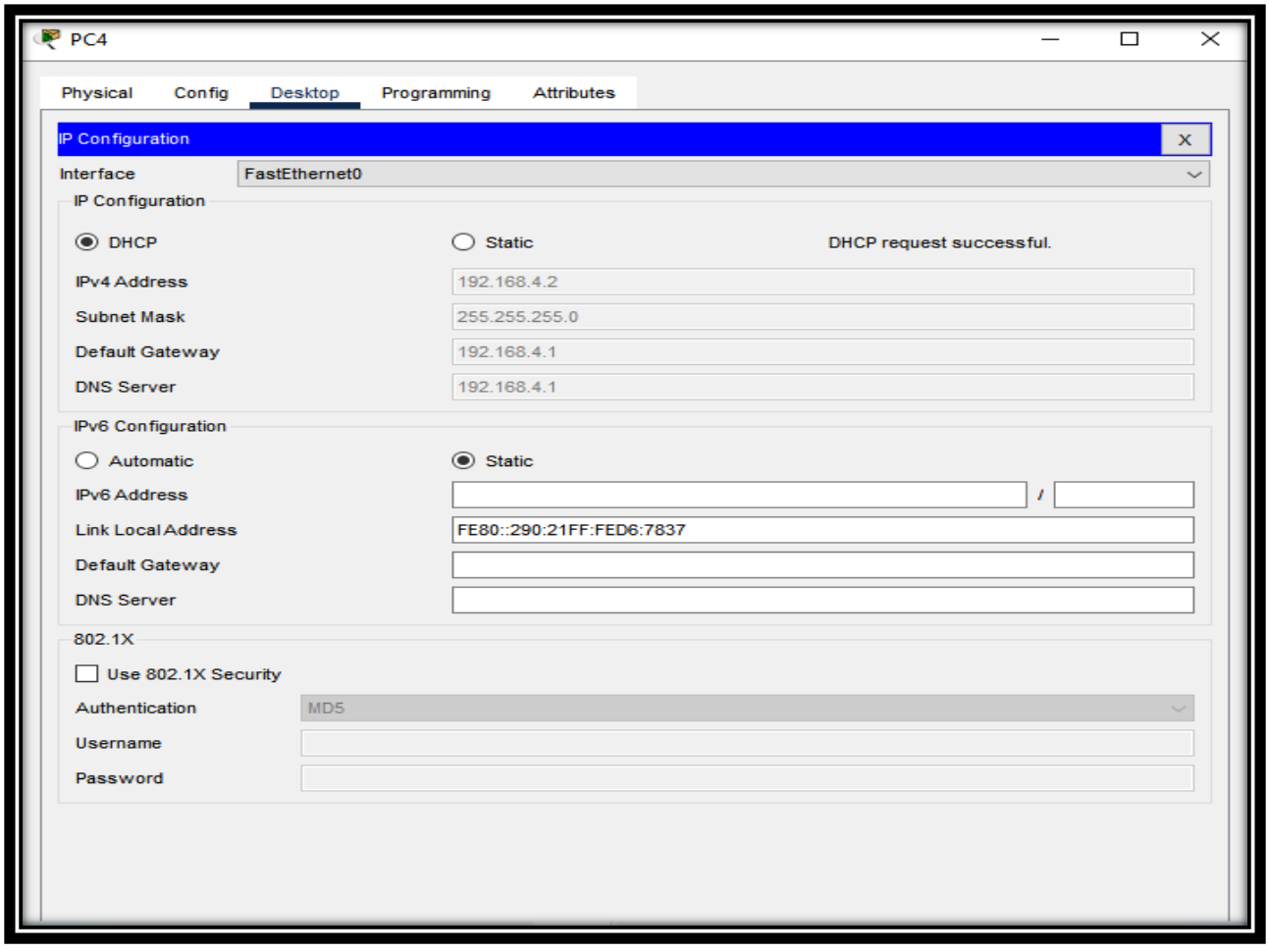
DHCP:

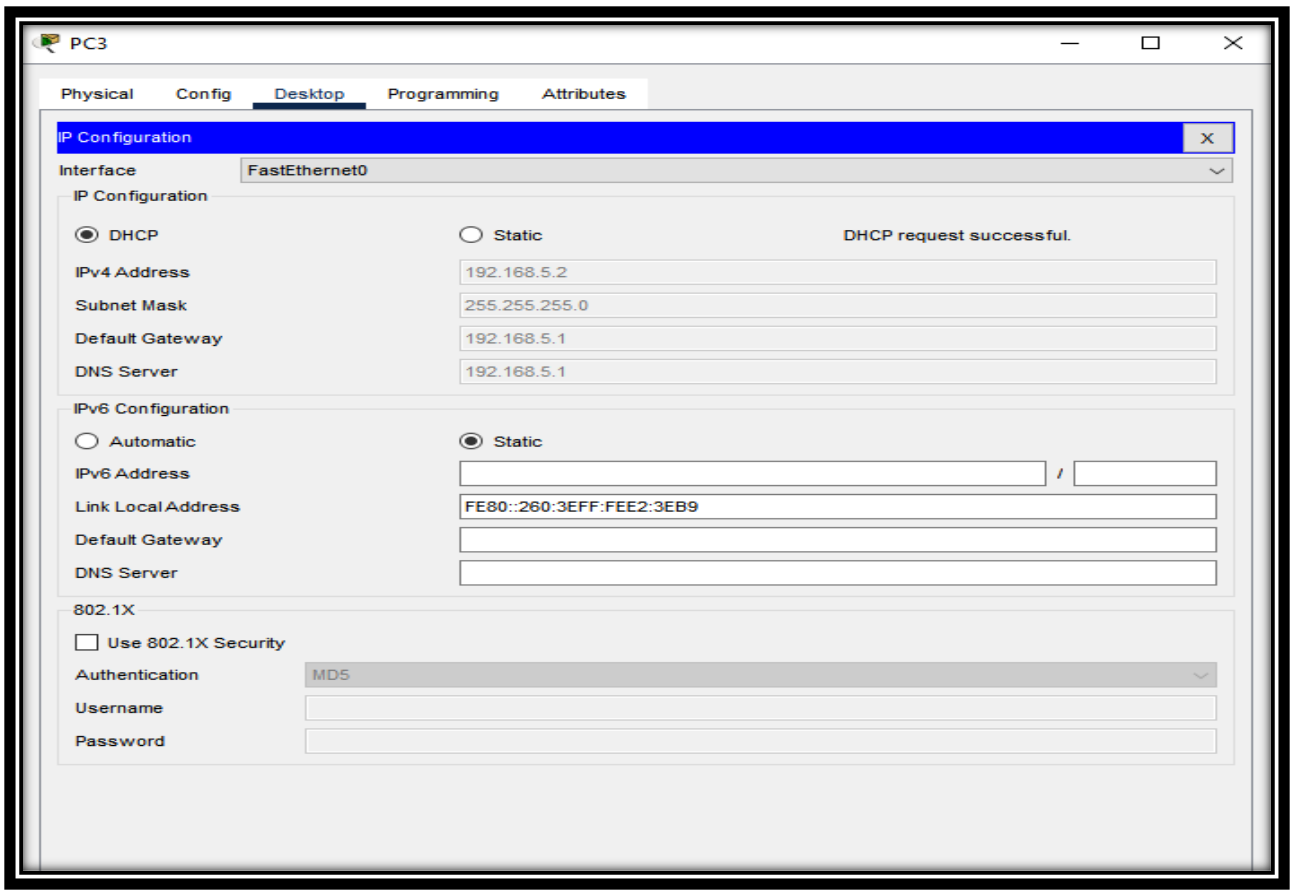
```
Router(config)#service dhcp
Router(config)#ip dhcp pool MARKETING
Router(dhcp-config)#network 192.168.5.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.5.1
Router(dhcp-config)#dns-server 192.168.5.1
Router(dhcp-config)#exit
Router(config)#
Router(config)#
Router(config)#
```

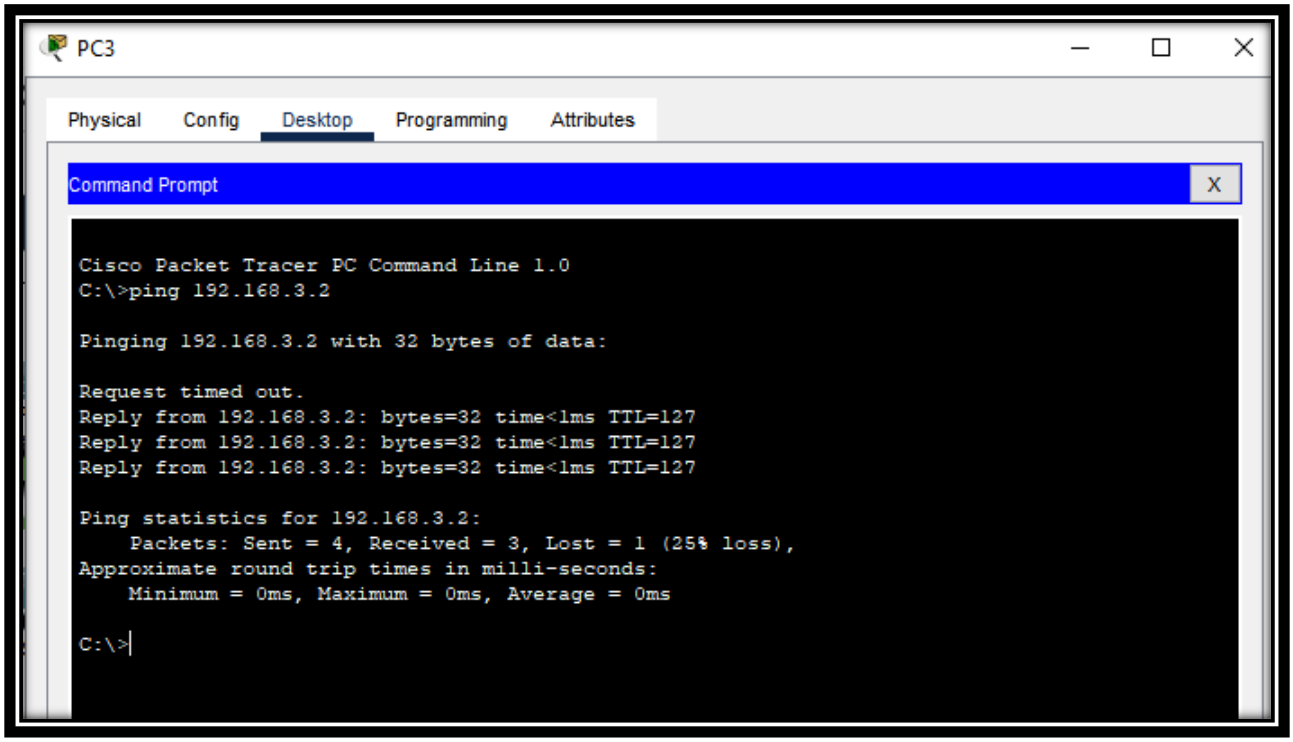
```
Router(config)#
Router(config)#ip dhcp pool HR
Router(dhcp-config)#network 192.168.4.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.4.1
Router(dhcp-config)#dns-server 192.168.4.1
Router(dhcp-config)#
Router(dhcp-config)#EXIT
Router(config)#DO WR
Building configuration...
[OK]
Router(config)#
```

```
Router(config)#
Router(config)#
Router(config)#
Router(config)#ip dhcp pool FINANCE
Router(dhcp-config)#network 192.168.3.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.3.1
Router(dhcp-config)#dns-server 192.168.3.1
Router(dhcp-config)#
Router(dhcp-config)#EX
Router(config)#DO WR
Building configuration...
[OK]
```


PC5
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
DHCP request successful.
IPv4 Address
192.168.3.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.3.1
DNS Server
192.168.3.1
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::201:96FF:FECA:A018
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password

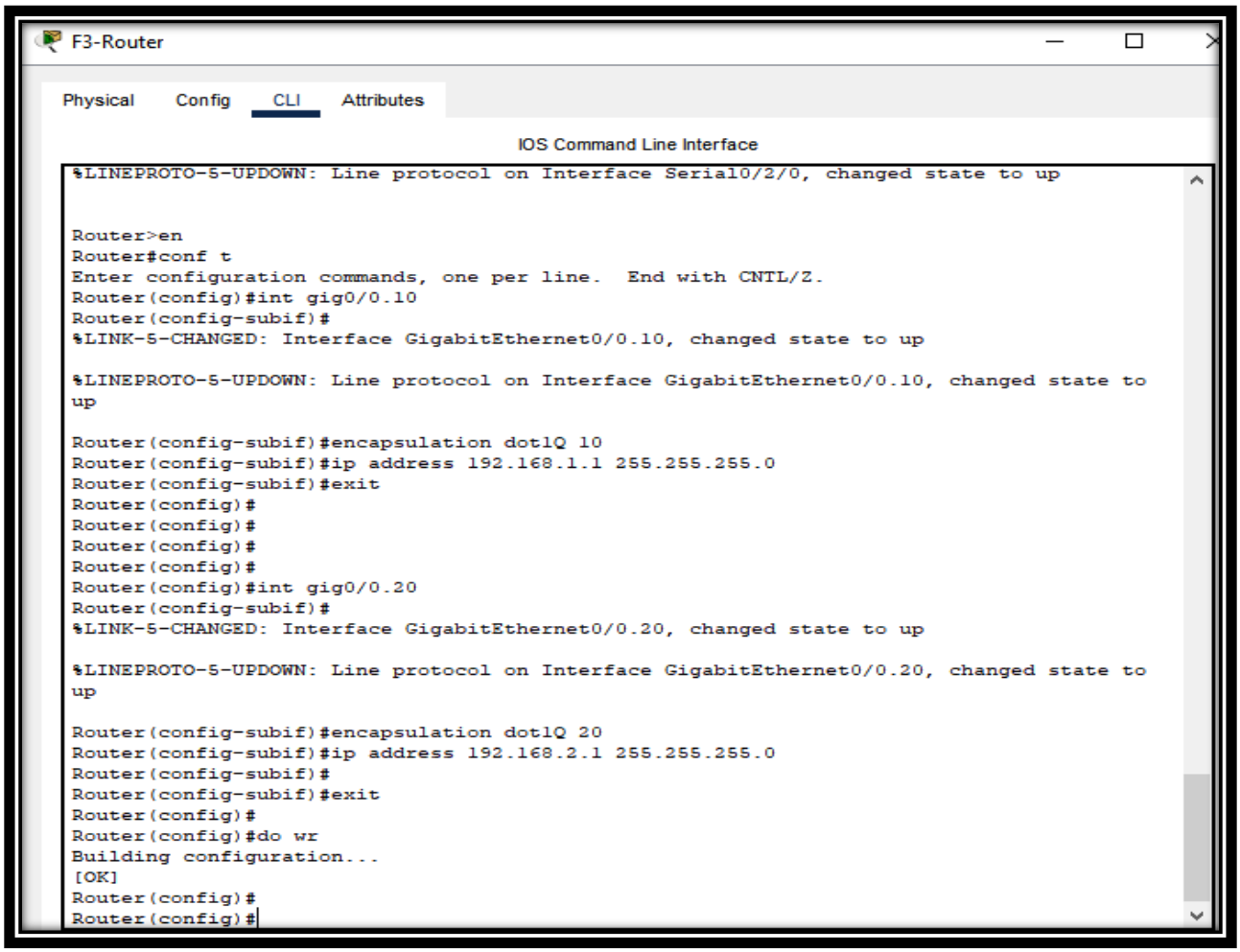

PC4
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
DHCP request successful.
IPv4 Address
192.168.4.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.4.1
DNS Server
192.168.4.1
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::290:21FF:FED6:7837
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password


PC3
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
DHCP request successful.
IPv4 Address
192.168.5.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.5.1
DNS Server
192.168.5.1
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::260:3EFF:FEE2:3EB9
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password


PC3
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.3.2
Pinging 192.168.3.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.3.2: bytes=32 time<1ms TTL=127
Reply from 192.168.3.2: bytes=32 time<1ms TTL=127
Reply from 192.168.3.2: bytes=32 time<1ms TTL=127
Ping statistics for 192.168.3.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>

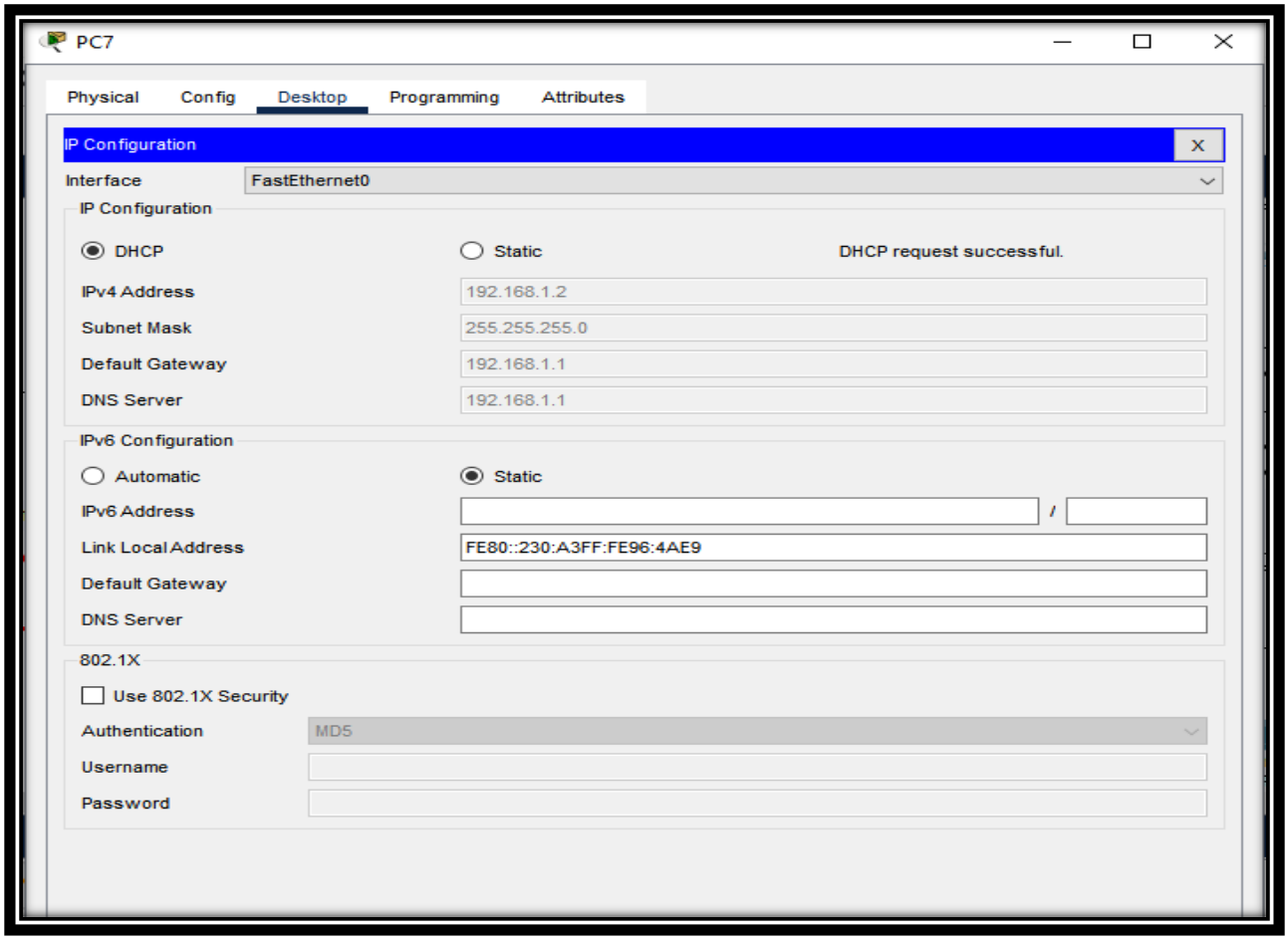
F3-ROUTER:

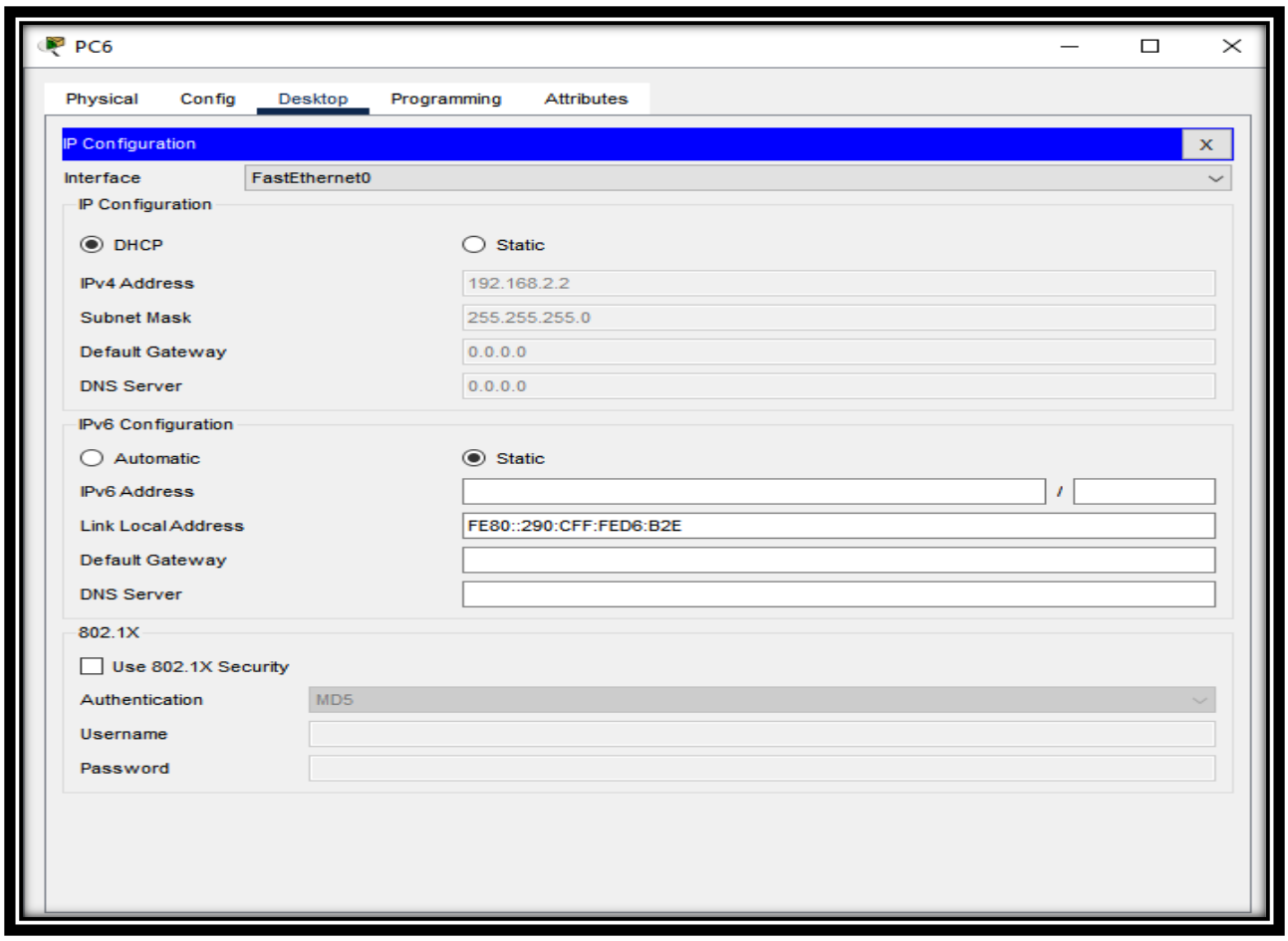
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int se0/2/0
Router(config-if)#ip address 10.10.10.6 255.255.255.252
Router(config-if)#int se0/2/1
Router(config-if)#ip address 10.10.10.2 255.255.255.252
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#
```



```
Router(config)#
Router(config)#service dhcp
Router(config)#ip dhcp pool IT
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#dns-server 192.168.1.1
Router(dhcp-config)#exit
Router(config)#
```

```
Router(config)#
Router(config)#ip dhcp pool ADMIN
Router(dhcp-config)#network 192.168.2.0 255.255.255.0
Router(dhcp-config)#
Router(dhcp-config)#default-router 192.168.2.1
Router(dhcp-config)#dns-server 192.168.2.1
Router(dhcp-config)#exit
Router(config)#do wr
Building configuration...
[OK]
Router(config)#
Router(config)#
```






```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=35ms TTL=128
Reply from 192.168.2.2: bytes=32 time=2ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time=2ms TTL=128

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 35ms, Average = 9ms
```

OSPF ROUTING PROTOCOL:

Router 1:

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 10
Router(config-router)#network 10.10.10.4 255.255.255.252 area 0
Router(config-router)#network 10.10.10.8 255.255.255.252 area 0
Router(config-router)#network 192.168.8.0 255.255.255.0 area 0
Router(config-router)#network 192.168.7.0 255.255.255.0 area 0
Router(config-router)#network 192.168.6.0 255.255.255.0 area 0
Router(config-router)#
Router(config-router)#do wr
Building configuration...
[OK]
Router(config-router)#
```

Router 2:

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 10
Router(config-router)#network 10.10.10.0 255.255.255.252 area 0
Router(config-router)#network 10.10.10.8 255.255.255.252 area 0
Router(config-router)#network 1
08:09:55: %OSPF-5-ADJCHG: Process 10, Nbr 192.168.8.1 on Serial0/1/1 from LOADING to
FULL, Loading Done
92.168.3.0 255.255.255.0 area 0
Router(config-router)#network 192.168.4.0 255.255.255.0 area 0
Router(config-router)#network 192.168.5.0 255.255.255.0 area 0
Router(config-router)#do wr
Building configuration...
[OK]
```

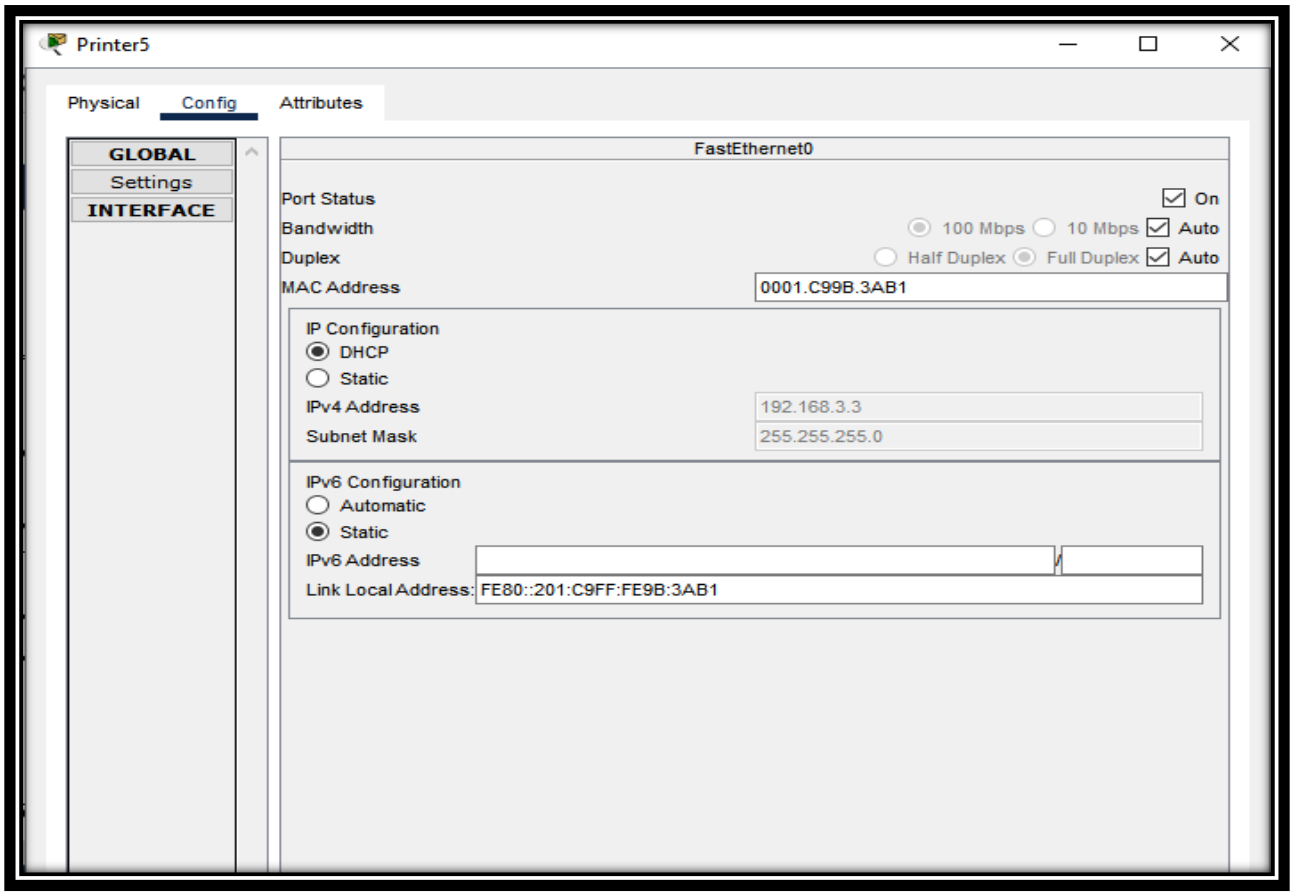
Router 3:

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 10
Router(config-router)#network 10.10.10.0 255.255.255.252 area 0
Router(config-router)#
08:15:28: %OSPF-5-ADJCHG: Process 10, Nbr 192.168.5.1 on Serial0/2/1 from LOADING to
FULL, Loading Done
network 10.10.10.4 255.255.255.252 area 0
Router(config-router)#do
08:15:52: %OSPF-5-ADJCHG: Process 10, Nbr 192.168.8.1 on Serial0/2/0 from LOADING to
FULL, Loading Done
 wr
Building configuration...
[OK]
Router(config-router)#network 192.168.1.0 255.255.255.0 area 0
Router(config-router)#network 192.168.2.0 255.255.255.0 area 0
Router(config-router)#do wr
Building configuration...
[OK]
Router(config-router)#
```

- Now ping pc7 to pc 0

```
Pinging 192.168.6.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.6.2: bytes=32 time=10ms TTL=126
Reply from 192.168.6.2: bytes=32 time=11ms TTL=126
Reply from 192.168.6.2: bytes=32 time=12ms TTL=126

Ping statistics for 192.168.6.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 12ms, Average = 11ms
```

Printer 5:



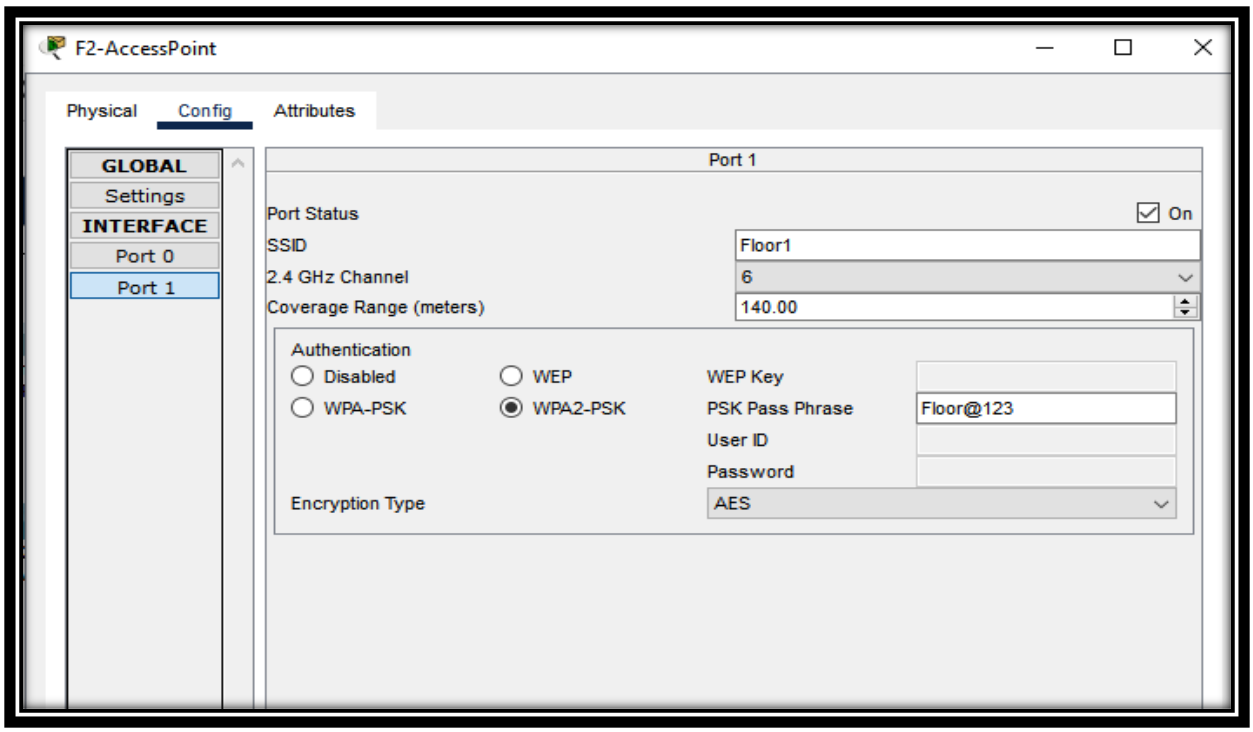
- Ping pc7 to printer 5:

```
C:\>ping 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.3.3: bytes=32 time=11ms TTL=126
Reply from 192.168.3.3: bytes=32 time=11ms TTL=126
Reply from 192.168.3.3: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.3.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 11ms, Average = 7ms

C:\>
```

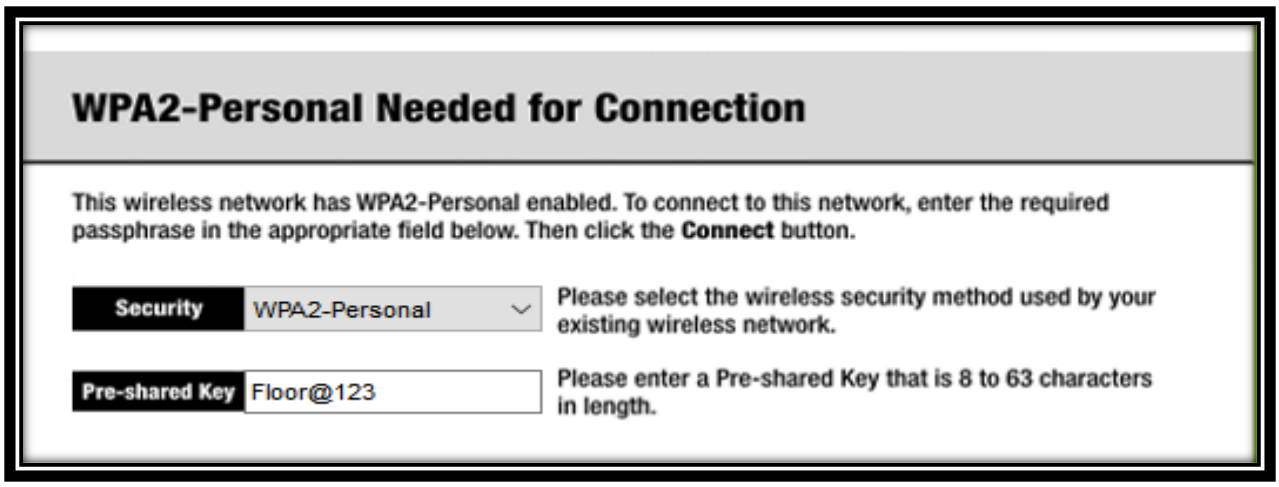
Enable wifi connection:

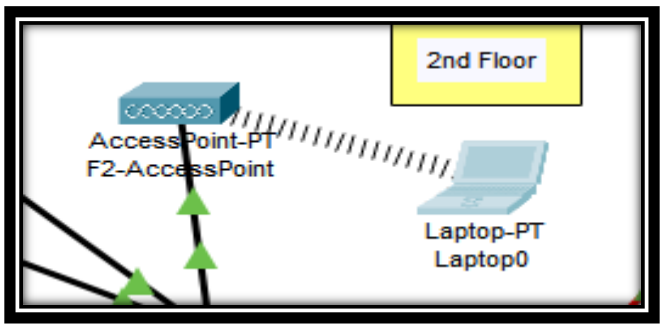
- Replace the module of laptop to WPC300N

- F2-access point:


F2-AccessPoint
Physical
Config
Attributes
GLOBAL
Settings
INTERFACE
Port 0
Port 1
Port 1
Port Status
On
SSID
Floor1
2.4 GHz Channel
6
Coverage Range (meters)
140.00
Authentication
Disabled
WEP
WPA-PSK
WPA2-PSK
WEP Key
PSK Pass Phrase
Floor@123
User ID
Password
Encryption Type
AES


Laptop0
Physical
Config
Desktop
Programming
Attributes
Link Information
Connect
Profiles
Below is a list of available wireless networks. To search for more wireless networks, click the Refresh button. To view more information about a network, select the wireless network name. To connect to that network, click the Connect button below.
Wireless Network Name
CH
Signal
Floor1
1
45%
Default
1
45%
Default
1
45%
Site Information
Wireless Mode
Infrastructure
Network Type
Mixed B/G
Radio Band
Auto
Security
WPA2-PSK
MAC Address
0001.C949.A407
Refresh
Connect
2.4GHz
Adapter is Active
Wireless-N
Notebook Adapter
Wireless Network Monitor v1.0
Model No.
WPC300N



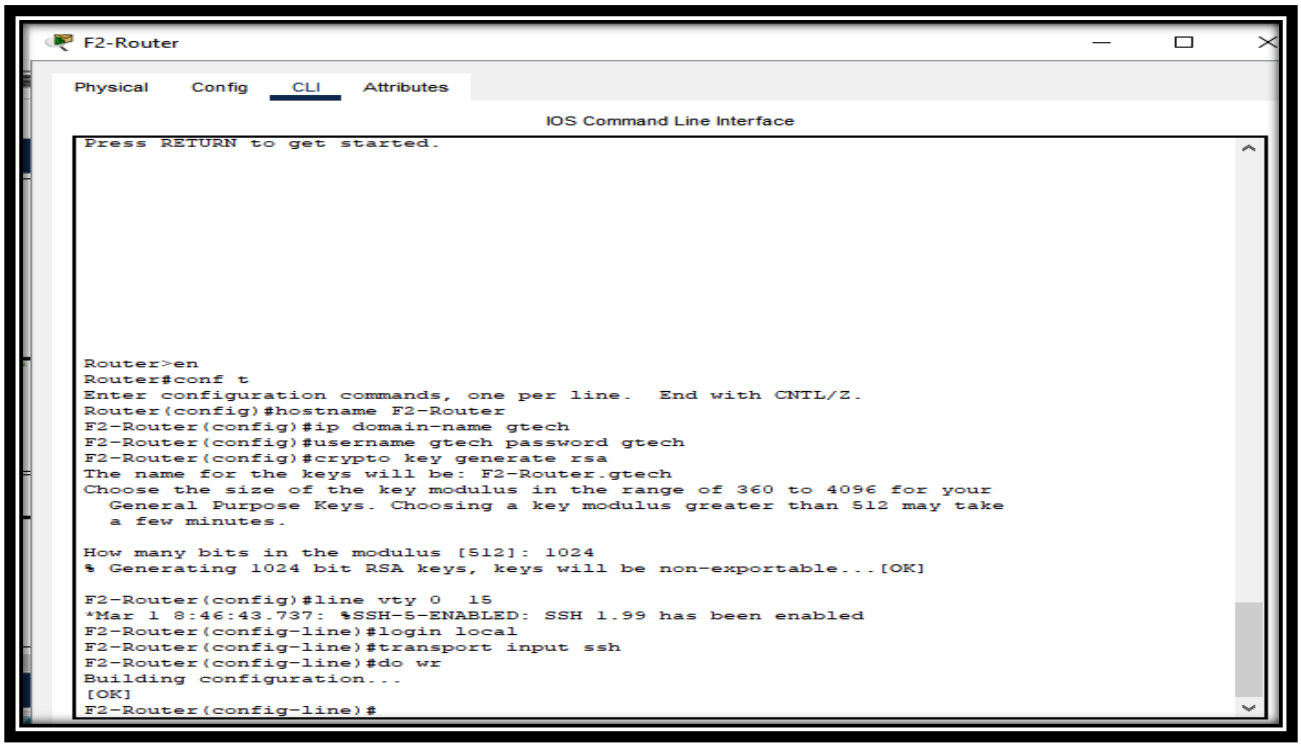


Configure SSH:

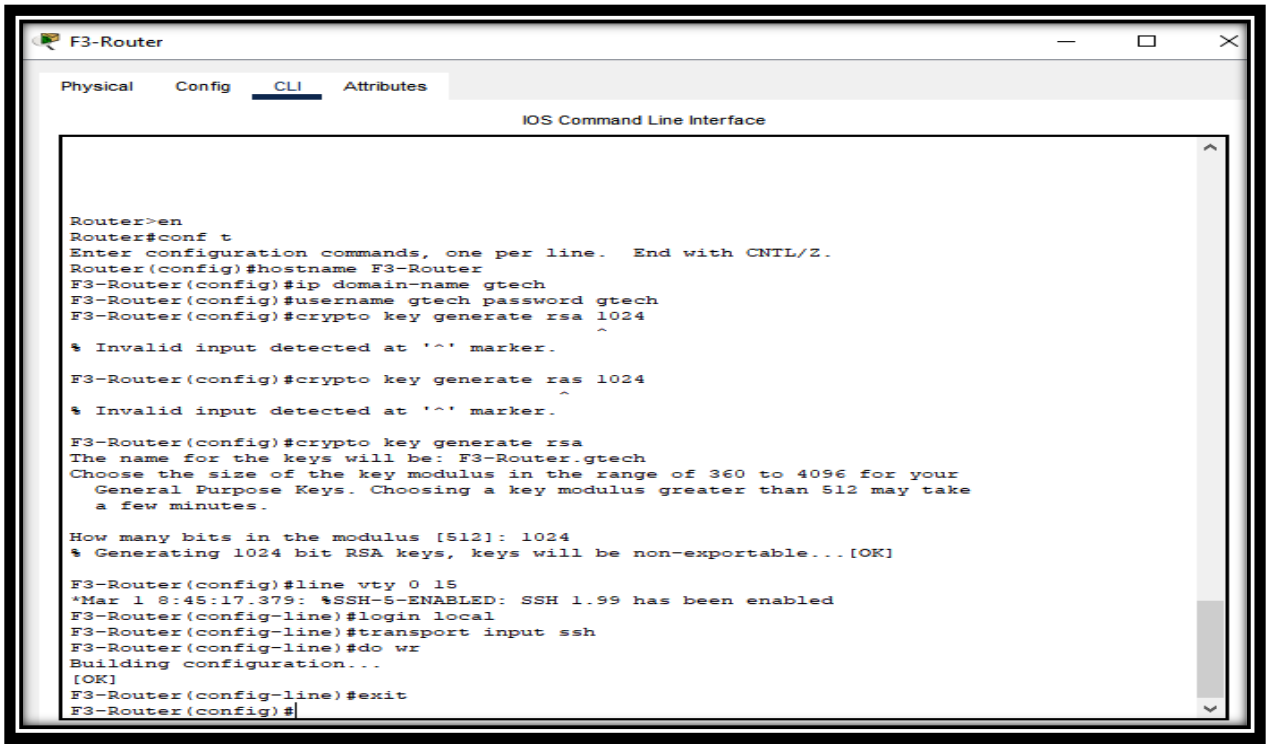
Router 1:

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname F1-Router
F1-Router(config)#ip domain-name gtech
F1-Router(config)#username gtech password gtech
F1-Router(config)#crypto key generate rsa
The name for the keys will be: F1-Router.gtech
Choose the size of the key modulus in the range of 360 to 4096 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

F1-Router(config)#line vty 0  15
*Mar 1 8:47:37.758: %SSH-5-ENABLED: SSH 1.99 has been enabled
F1-Router(config-line)#login local
F1-Router(config-line)#transport input ssh
F1-Router(config-line)#do wr
Building configuration...
[OK]
F1-Router(config-line)#exit
F1-Router(config)#
```

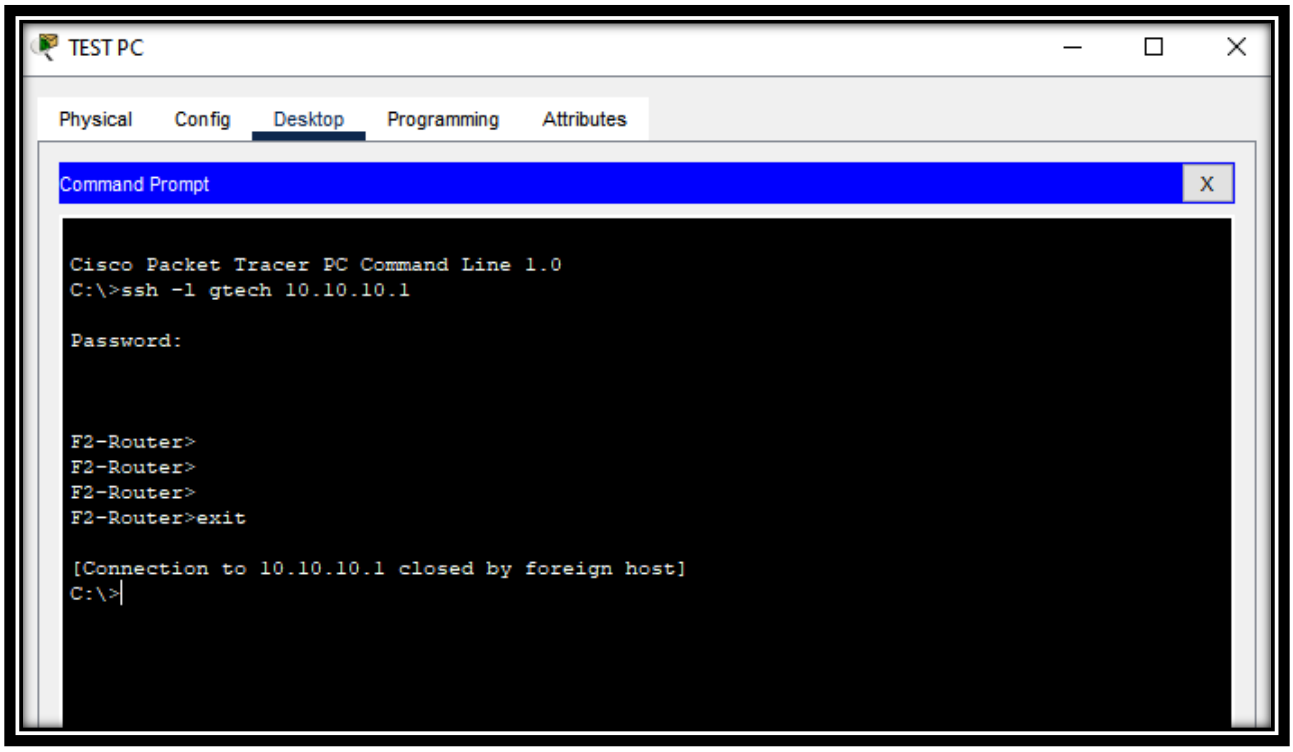
Router 2:



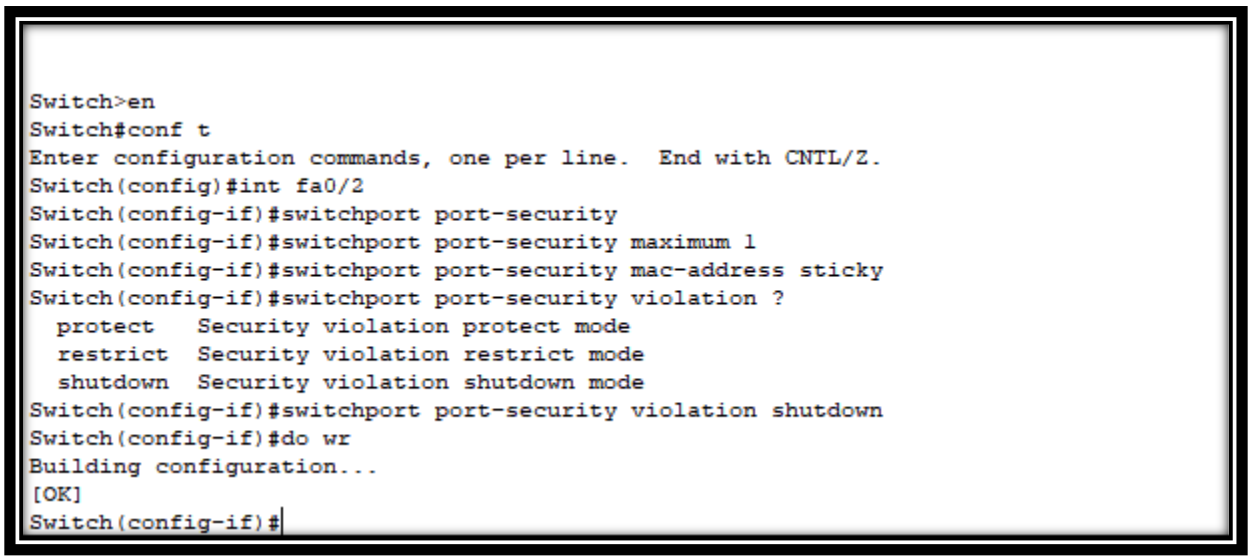
Router 3:



TEST REMOTE LOGIN:



PORT SECURITY TO IT DEPARTMENT:

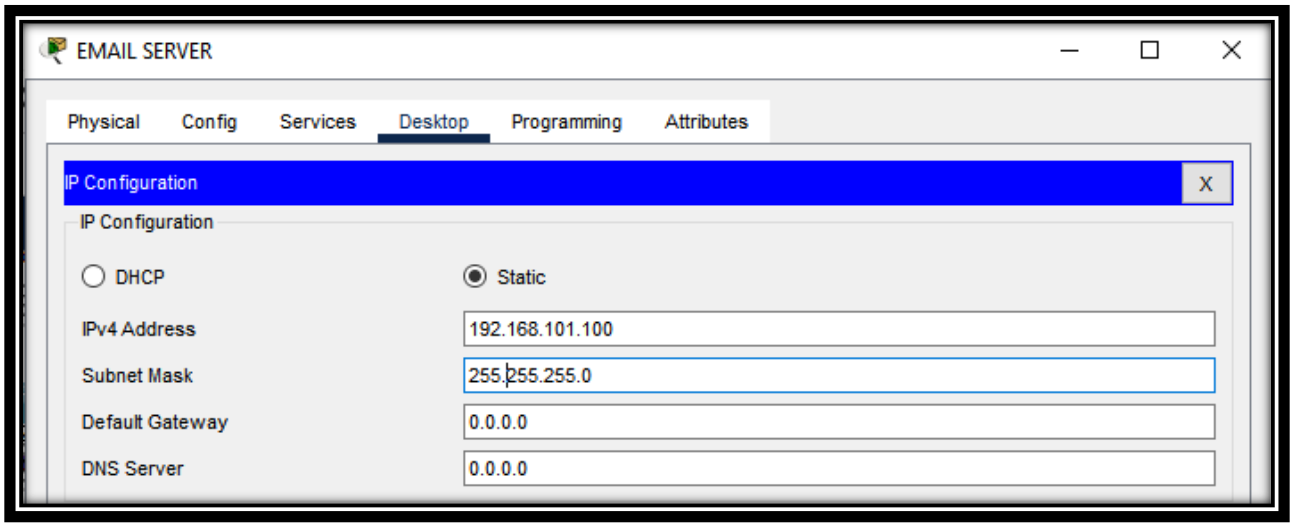


```
Switch(config-if)#do sh start
Using 1430 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Switch
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 switchport mode trunk
!
interface FastEthernet0/2
 switchport access vlan 20
 switchport mode access
 switchport port-security
 switchport port-security mac-address sticky
!
```

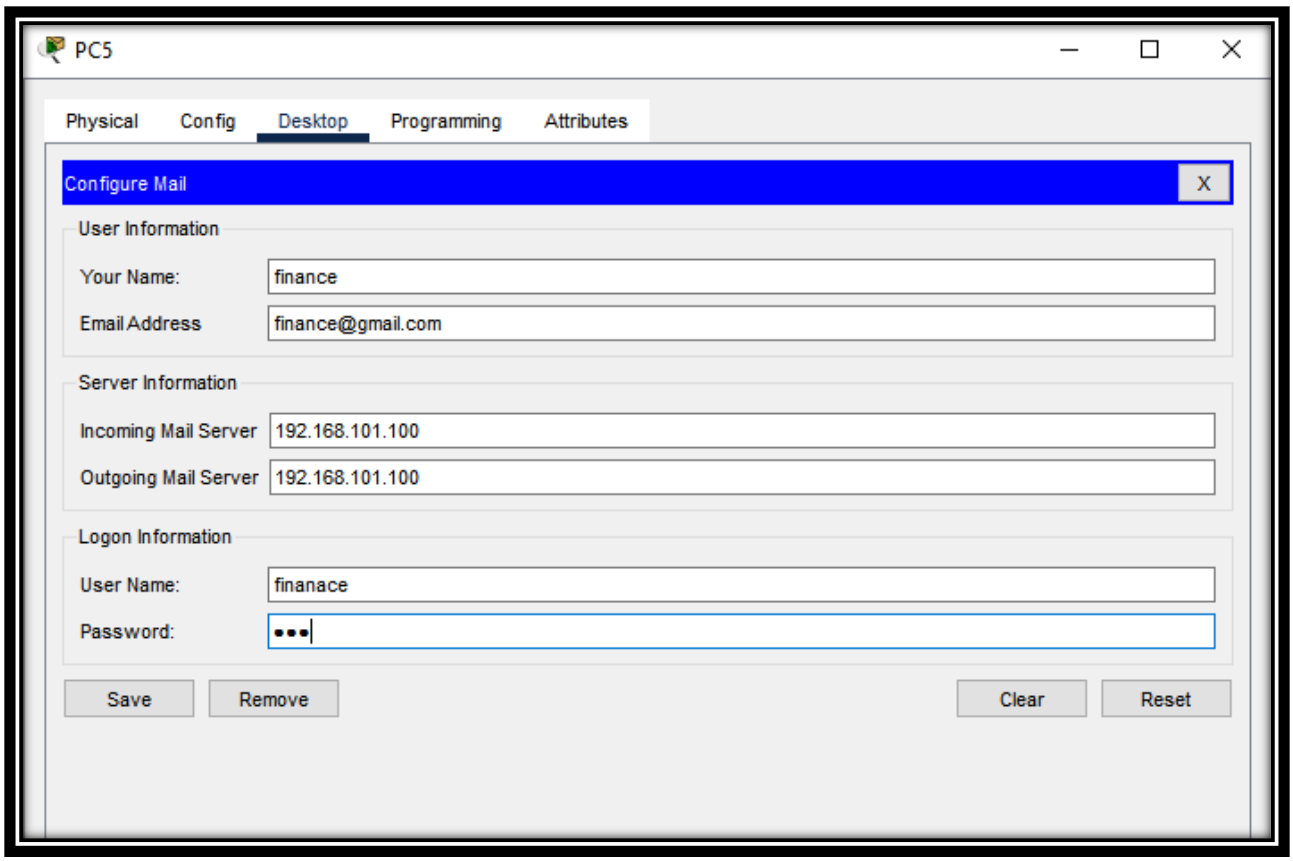
```
Switch(config-if)#exit
Switch(config)#do sh port-security
Secure Port MaxSecureAddr CurrentAddr SecurityViolation Security Action
               (Count)       (Count)        (Count)
------------------------------------------------------------------------
        Fa0/2        1          0                0         Shutdown
------------------------------------------------------------------------
Switch(config)#
```

```
router ospf 10
 log-adjacency-changes
 network 10.10.10.4 0.0.0.3 area 0
 network 10.10.10.8 0.0.0.3 area 0
 network 192.168.8.0 0.0.0.255 area 0
 network 192.168.7.0 0.0.0.255 area 0
 network 192.168.6.0 0.0.0.255 area 0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login local
 transport input ssh
line vty 5 15
 login local
 transport input ssh
!
!
!
end

Fl-Router#
Fl-Router#
```

EMAIL CONFIGURATION ON 2ND FLOOR:



Setting email on every pc


PC5
Physical
Config
Desktop
Programming
Attributes
Configure Mail
X
User Information
Your Name:
finance
Email Address
finance@gmail.com
Server Information
Incoming Mail Server
192.168.101.100
Outgoing Mail Server
192.168.101.100
Logon Information
User Name:
finanace
Password:
Save
Remove
Clear
Reset